Rare-earth Information Center INSIGHT

Ames Laboratory
Institute for Physical Research and Technology
Iowa State University / Ames, Iowa 50011-3020 / U.S.A.

Volume 5 | January 1, 1992 | No. 1

RIC-SNTT Agreement to Share Resources

The Rare-earth Information Center (RIC) and the Society of Non-Traditional Technology (SNTT) have reached an agreement to share their information data systems to help promote the development and advancement of the science and technology of rare metals, especially the rare earth elements. RIC's literature data base has over 53,000 references on rare earth materials, which can be accessed through keywords (~34,000) or authors (~46,000). SNTT has a factual data base (over 80,000 entries) which contains physical and chemical properties of rare metal materials in the form of tabular and/or graphical data. The RIC-SNTT agreement will allow SNTT to search the RIC's literature data base for literature citations on rare earth materials, while RIC will be able to search SNTT's factual data base for numerical and/or graphic information on the properties of rare earth and other materials. The Society for Non-Traditional Technology is located in Tokyo, Japan and is supported by Science and Technology Agency of Japan and Japanese industrial corporations.

In time we expect that other scientists, engineers and other professionals will be able to access RIC's literature data base electronically without interacting with RIC's staff.

11/25 Debuts HDTV

On Monday November 25, 1991 Japanese TV stations began a new era by broadcasting high-definition television (HDTV) for eight hours a day. However, only a micro fraction of the Japanese people were watching the brilliant movie-theater-like images, since only 2000 sets (which cost $30,000) had been sold by 11/25 and are found in some hotel lobbies and public buildings. The HDTV television sets have 1125 lines and our astute readers will have immediately connected the number of lines with the debut date, which the Japanese government called Hi-Vision Day. And if you want to get a lightweight VCR for your HDTV set NEC Corporation has one available for $115,000. Prices for both the TV sets and VCR's will drop in time. But many technical managers, engineers and scientists wonder if the Hi-Vision analog technology will be outdated in the next few years, especially in view of the belief that the Federal Communications Commission of the United States will adopt an all-digital television standard in 1993. One of the main advantages of the digital technology is that television and computers can be blended together and images can be manipulated and stored just like computer graphics. Within ten days of the 11/25 announcement General Instrument Corporation of

-Over-

Telephone: (515) 294-2272
Facsimile: (515) 294-3709
Telex: 269266
BITNET: RIC@ALISUVAX

New York announced that they were the first to complete a prototype digital high-definition television system. A third standard is being developed in Europe, but RIC has no details concerning its status.

The development and commercial realization of HDTV will have an impact in the late 1990's on the rare earth industry, especially the phosphor producers and the companies that supply 99.99+% pure rare earth oxides, see **RIC Insight**, **3**, 2 (January 1, 1990).

Transparent Polycrystalline YAG

Kurosaki Refractories Company, Limited recently announced that they have developed an atmospheric pressure process for producing transparent polycrystalline YAG (yttrium aluminum garnet) materials by a solid-phase reaction. This technology is much simpler than the conventional Czochralski method for producing single crystal YAG (see October 1, 1991 issue of **RIC Insight 4**, 2). The new process takes about three days, one-tenth of the time needed in the Czochralski technique, thus substantially reducing the production costs.

The transparent polycrystalline YAG is usable, when doped with neodymium, as a laser material for many applications, including laser machining, laser surgical scalpels and communication equipment. The company is planning production facilities for producing this material in the form of rectangular rods 5.0 x 1.5 cm in cross-section and 10 cm long.

Eye-Safe Laser

Eye-safe holmium lasers operating at 2 μm are considered to be promising sources for Doppler wind sensors, water vapor profiling, and low altitude wind shear detectors. Other applications for which short duration optical pulses at 2 μm are required include altimetry, ranging and topographical applications, and nonlinear optical studies. The major problem is that up-conversion in many hosts has a deleterious influence which is manifest by an effective lifetime reduction with a concomitant reduction in the energy storage capacity and a loss of conversion efficiency. B.T. McGuckin *et al.* from the Jet Propulsion Laboratory, California Institute of Technology, Pasadena, report that they found a thulium, holmium-doped $YLiF_4$ (Tm,Ho:YLF) laser had properties which overcome some of these difficulties. An output energy of 220 μJ in pulses of 22 ns duration were recorded for Tm,Ho:YLF. The effective upper laser level lifetime was 6 ms, which is at least a factor of two longer than that observed in other hosts. This lifetime permits a 64% extraction of the stored energy, which is close to the projected maximum performance for these materials. The doping level of thulium is 6% and that of holmium is 0.4% in $YLiF_4$. The details of this eye-safe laser were reported in **Appl. Phys. Lett. 59**, 2926 (1991).

Karl A. Gschneidner Jr.

K. A. Gschneidner, Jr.
Editor and Director RIC